

IS LEAD A SUSTAINABLE COMMODITY?

- The use of lead in many products, particularly those of major importance, gives little cause for concern, and offers considerable economic and practical advantages.
- Levels of lead exposure in the general population have fallen over the past two decades in many countries, particularly the EU and USA. The vast majority of the population now receives doses well below levels of concern.
- Some of the minor applications of lead have impacts, or the potential for impacts, either in use or disposal, and the use of suitable risk management measures should be pursued. The most damaging applications of lead have been phased out in the West, although some old products such as paint and pipes continue to cause elevated exposure to a minority of the population. Some of these products are still used outside Western countries.
- As the use of lead in dispersive applications declines, emissions from manufacturing industry and from refuse disposal by incineration and landfill, are becoming proportionally more significant sources of lead in the environment.
- Good practice in the production of lead can reduce, though never eliminate, emissions, and corresponding risks to workers, local residents, and the environment. Standards vary even between different plants in the EU, and much more so world-wide. Though great improvements have been made, industrial emissions remain a matter for close attention.
- Changing patterns of lead use are likely to help reduce impacts during manufacture, use and disposal of products, as dispersive applications are phased out, and higher proportions are recycled.
- Historical practices have resulted in contamination which remains in soils for centuries. Present practice has significantly reduced emissions, and impacts on the environment have decreased markedly. The long term fate of lead, particularly in refuse, is likely to be an important focus of attention in the future.
- It may be concluded that lead is a sustainable commodity when produced, used and recycled in a responsible manner. Efforts to restrict or even ban its

use are not backed up by sound scientific evidence, but rather based on emotive comment and misguided public perception.

- compare the impacts of lead with those of alternative products.

The pattern of lead usage and production has changed dramatically during recent decades, and thus so have the impacts. It is helpful to consider the current situation.

CURRENT STATUS OF LEAD CONSUMPTION

- total world-wide consumption is slowly rising (currently 6 million tonnes per year 1995-1998 (ILZSG, 1999));
- batteries (for vehicles and for emergency power supply) account for the majority of lead use, and are of growing importance;
- other significant uses of metallic lead are in building, alloying, cable sheathing, and shot and weights;
- the major use of lead compounds is in glass for television and computer monitor screens. Other important uses include PVC, lead crystal and some ceramics glazes. Small quantities are used in some paints for special applications;
- uses which have been or are in the process of being phased out in the EU include white lead paints, petrol and pipes.

CURRENT STATUS OF LEAD MANUFACTURE

- total production is slowly rising to keep pace with demand, particularly in some parts of the developing world;
- world-wide, around 50% of lead is produced from scrap batteries and other products. The proportion is higher in many industrialised countries. Recycling rates of lead compare very favourably with other materials;
- the proportion of secondary production is increasing as dispersive applications of lead (petrol and paint) are phased out in many countries. As a result more of the lead used is suitable for recycling;
- in many recycling processes (steel, copper, brass, etc.), lead is concentrated via flue dust and recovered in the recycling chain for zinc, tin and other metals;
- some losses to the environment are inevitable from the production of lead (as with all manufacturing processes);
- secondary production of lead from scrap results in less solid wastes, uses less energy and reduces the consumption of mineral resources, compared to the production of lead from ore;
- control measures implemented in the EU have greatly reduced the emissions from factories in recent decades. However, the situation is less certain in parts of the developing world.

CURRENT STATUS OF HUMAN EXPOSURE

- the level of lead exposure in the general population in the EU and other Western countries has fallen dramatically in the last 2 decades;

- this is partly attributable to the phasing out of lead in petrol. Other contributions have been from reduced use of leaded pipes, paints, solder in food cans, plumbing solders and reductions in industrial emissions;
- the majority of the general population in the West has very low levels of lead exposure which give no cause for concern;
- a small minority of the population in some Western countries continues to receive elevated exposure. This is mainly from old lead products which remain in service (pipes in the water distribution system and paint). Proximity to industry contributes to some cases;
- exposure to lead in the workplace has fallen dramatically as a result of various control measures. However, there continue to be very small numbers of cases causing concern.

The questions to be addressed here include:

- does the continued use of lead and lead containing products present significant risks to human health or the environment?
- do the advantages of using lead for certain applications justify its use, when considering potential risks to health or the environment?

It must be recognised that:

1. In the past, widespread use of lead in dispersive applications (particularly petrol and paint) has caused considerable environmental contamination, with consequences for human health and the environment which can sometimes still be observed today. The elevated environmental levels will remain for centuries in soils, although mostly in a non-bioavailable form. Similarly, lead water pipes continue to contribute to elevated levels of lead intake to a proportion of the population in areas of soft water. The risks arising from these uses have been reduced as a result of controls and legislation.

2. In the Western World, exposure of humans to lead has fallen considerably in the last two decades. The phasing out of leaded petrol is considered the most significant single factor in this. Other contributing factors are: phasing out of leaded paints; phasing out of leaded solders in food cans; phasing out of leaded water pipes and improved treatments of waters to reduce plumbosolvency; improved industrial controls. As a result, the majority of the population has lead intakes which are well within accepted limits, and not believed to be detrimental to health. However, certain minority groups have levels of exposure which could be detrimental, particularly to children. These are generally related to industrial sources, high lead content in water, some hobbies which involve lead or lead compounds; or, most importantly for young children, exposure to old leaded paint and lead-rich soil and indoor dust.

3. Major modern uses of lead (particularly in batteries, television glass, radiation shielding) offer considerable advantages over alternatives and present no recognisable hazard to humans or ecosystems.
4. Some minor applications can have impacts and alternatives are available, or could be in the future, though they may be more expensive. Lead shot and fishing weights can poison waterfowl and add to lead levels in soils and sediments; their use is restricted or banned in wetland areas in some EU Member States. Lead incorporated into glass or glazed tableware has the potential to leach into food or beverages (particularly acidic fruit or beverages) which are stored in them; such items are required to pass standard tests to ensure that leaching rates are low. These potential impacts are recognised, and some measures are taken in the EU and elsewhere to avoid problems.
5. Many of the minor and dispersive applications of lead end up in the ground or in waste streams. There is thus the possibility of migration into soils and waters, and uptake by living organisms in the future. The fate of lead in waste streams is likely to be the subject of increasing attention in the future.
6. The long term fate of lead in the environment depends upon the chemical form in which it occurs, since this affects its ability to migrate and enter food chains. Many forms of lead have low mobility and little effect on living species; the chemical forms of lead can change over time, particularly if the water table moves, or if the acidity of the environment changes.
7. Production of lead invariably results in some releases and can, in certain cases, cause adverse effects on health. Significant improvements in industrial practice have been made, which have lowered the impacts of the manufacture of lead and its products in many countries. However, this still remains an important issue.
8. Most of the lead used at present is for products suitable for recycling, and recycling rates of lead are far better than those of most other materials. However, efforts should be made to improve recycling rates still further in order to avoid lead losses in the waste stream and to reduce the potential impacts of lead production on ecosystems and on human exposure.

CONCLUSIONS

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